# Real-Time Windows Target, Simulink, and the ECP Model 210 (or Model 205)

### *The Very Short Version*

**Step 1**. First of all, *you must be using Malab R2008a to use the real-time windows target with the ECP systems.* Once you have started the correct version of Matlab, we need to get some communications started.

**Step 2**. Now we need to inform the ECP system that we will be using Simulink and the real-time windows target. To do this, click **Start -> Programs -> ECP**

The ECP window should pop up, something like the window shown below:

First select on **Utility-> Download Controller Personality File.**

Then select   **C: -> Program Files -> ECP Systems -> cn**

Finally select **m210_rtwt_3.pmc for** the Model 210 (or **m205_rtwt_3.pmc** for the Model 205)  and click on **open**. Wait for the ECP system to load the personality file.

**Step 3.** *Close the ECP Executive*.  *Do not just minimize it!!!!*

**Step 4**. Set the Matlab **current directory** to the folder where all of your files are located.

**Step 5**. Start Simulink by typing **Simulink**  in the Matlab window.

# Resetting the System Using Simulink

We often have to reset/reinitialize the system. In order to do this from Simulink we use the ECPDSPresetmdl.mdl Simulink model file. Thismodel is our friend, you will probably use it a lot.

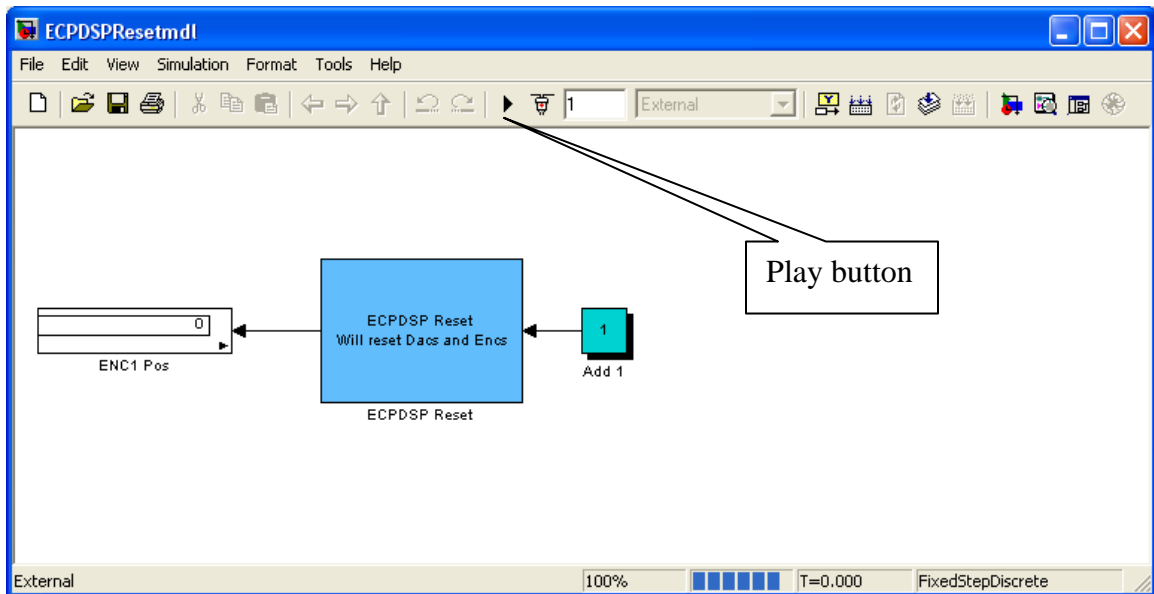**Step 1**. From Simulink select **File->Open ->ECPDSPResetmdl.mdl**

**Step 2. Compile** the file. This is usually only necessary the first time you open it. When you compile, a lot of stuff will be written to the Matlab window. Wait until the file is complied before you do anything else (the Matlab prompt will return).
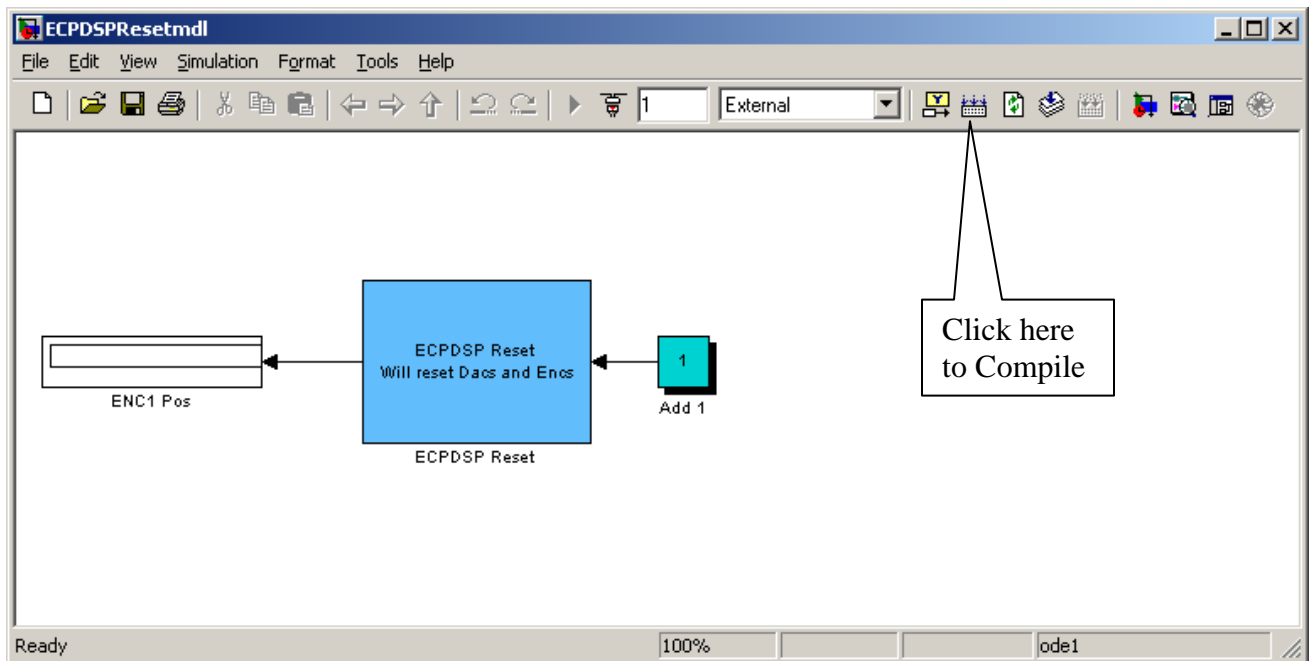
**Step 3**. Connect to the ECP system
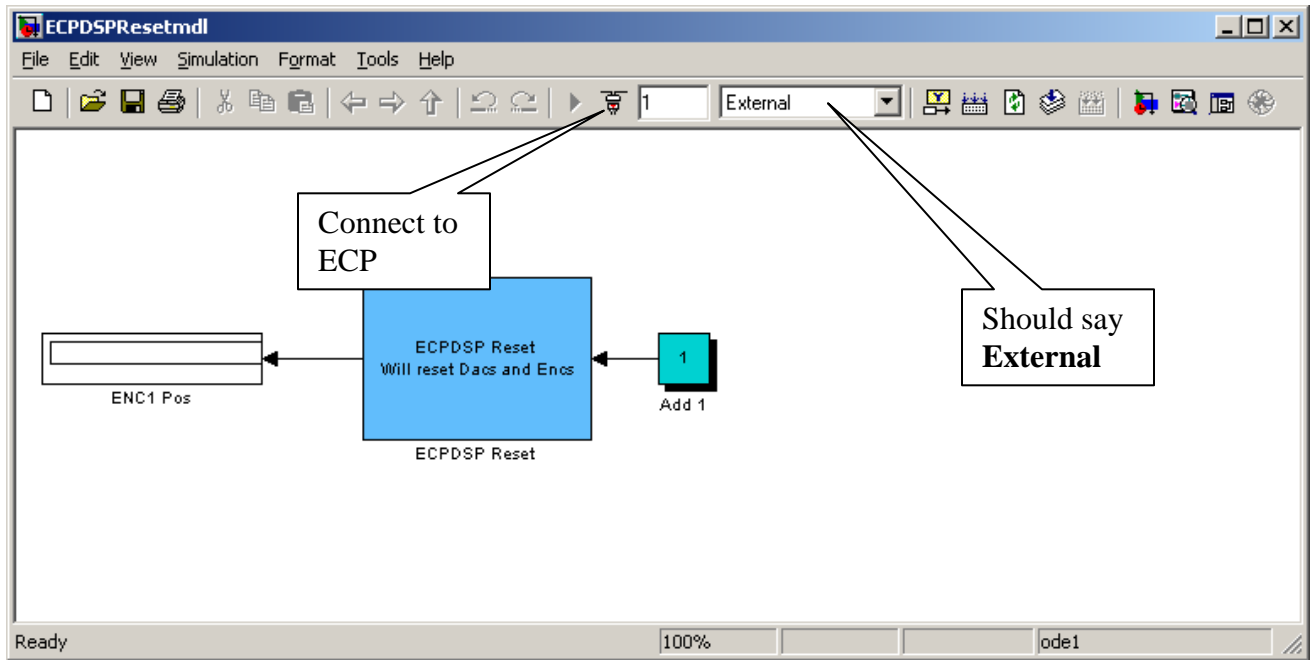


**Step 4**: Run it.

# Model210_Openloop.mdl

This section shows how to compile, connect, and run the Model 210 system. A very similar procedure is used for the Model 205 system.

The first thing we usually need to do is to identify the system by constructing a Bode plot and fitting the measured frequency response to the expected frequency response of the transfer function we expect. To do this we will usually use the Simulink file **Model210_Openloop,mdl.** After changing the input signal, and changing any simulation parameters**,** you are ready to compile**.**
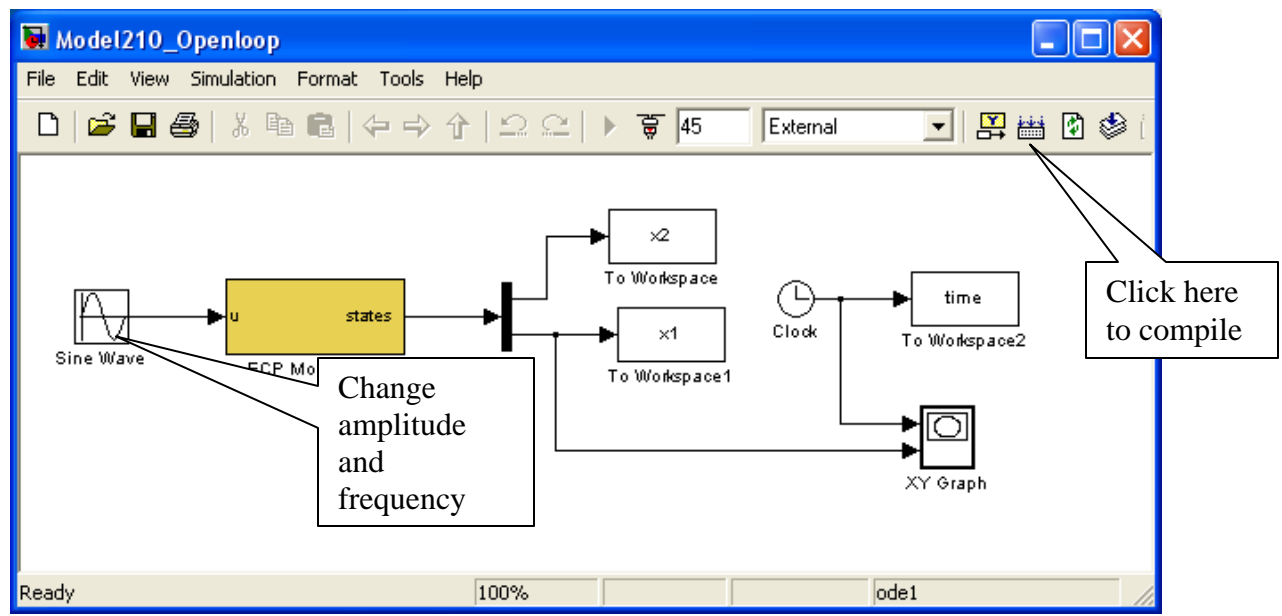
This particular implementation has the input signal in cm and the position of the first two carts measured in cm. Here, the position of the first mass is plotted as a function of time as the ECP system runs (the default is to plot for the first 20 seconds).
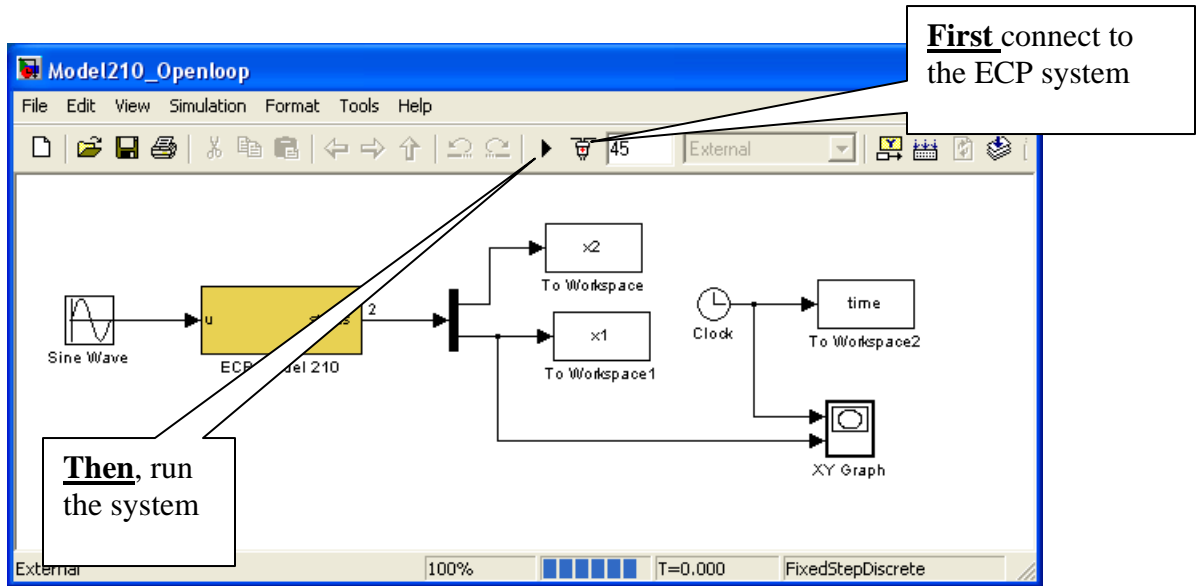


Once the simulation is started, you should be prepared to stop it. In software you can click on the Stop button, but you should be prepared to use the hardware cutoff on the ECE boxes if necessary.